



ACP Science and Technology Programme II

AFS/2013/329-240

WIKWIO Project Weed Identification and Knowledge in the Western Indian Ocean

Third technical workshop of the project WIKWIO
October 12-16, 2015
Moroni - Comoros



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Mission calendar

10-12/10/2015		CIRAD, IFP, MSIRI, CNDRS teams arrived in Comoros
12/10/2015	Workshop	Opening ceremony Presentation of partners Weed management challenges in Africa by FAO Presentation of the project WIKWIO Presentation of tools
13/10/2015	Workshop	Weed management in Comoros Training in data management in the portal
14/10/2015	Workshop	Field trip to Evembeni farm
15/10/2015	Workshop	Training activities in Madagascar Training activities in Comoros Training activities in Mauritius Training activities in Africa Training in data management in the portal Schedule of activities of the project for the third year Closing ceremony Cocktail
16/10/2015:	Partners meeting	Collaborations Wikwio / FAO Collaborations with African partners (South Africa) Debriefing session Administrative session
12-16/10/2015	Administrative meetings	Analysis of financial reporting of partners
17/10/2015		Departure of partners

Details of the programme of the workshop is presented in Appendix 1.

Introduction

The WIKWIO project

WIKWIO aims to strengthen science and technology orientation to achieving food security by enhancing agricultural productivity in the Southern African region. Agricultural productivity is hampered by many factors, one important among them being weeds. Agriculture and farming is becoming knowledge intensive and weed management also, but information access and its effective use still remains constrained in Africa and in the Indian Ocean. In a region that needs to modernize its agriculture rapidly, the use of new agricultural knowledge becomes essential and critical. WIKWIO aims to build and leverage a Science & Technology network which will consolidate existing scientific knowledge and facilitate sharing of new information on weeds and effective management practices for food and cash crops of the western Indian Ocean region

The launching workshop of the project was held on January 2014 in Mauritius. About ten months later, a second technical workshop occurred in Madagascar. By the end of the second year of the project, the third technical workshop in Comoros had four objectives:

- Present and discuss the participatory portal and mobile applications of the WIKWIO project with all Comorian actors and visitors;
- Training participants in data management through the participatory portal and in the use of mobile apps;
- Preparing a second phase of the project with new collaborations all over Africa.
- Analysis of administrative and financial aspects of the project to partners.

The third technical workshop

By the end of the second year of the project, the third technical workshop was held for five days in Moroni, Union of Comoros, at the Moroni Retaj Hotel (fig. 1).



Fig. 1: Moroni Retaj Hotel, Moroni, Comoros (© P. Marnotte - CIRAD)



Fig. 2: Banner of the third technical workshop (© P. Marnotte - CIRAD)

This third technical workshop brought together partner teams of the project (namely CIRAD¹, MCIA²/MSIRI³, FOFIFA⁴, CNDRS⁵ and IFP⁶), invited people from Italy (FAO weed officer), and South Africa (ARC), and actors from Comoros such as agronomists from National Research Center (CNDRS), representatives of small farmers, weed scientists, extension service providers, botanists, and University lecturers. Moreover, several personalities were invited to attend the Opening ceremony such as representatives from the Delegation of the European Union in the Union of Comoros, PNUD⁷/United Nations Comoros, GEF⁸-Comoros government project on agriculture and climate change.

Unfortunately, several people invited to attend the workshop were obliged to cancel their participation, sometimes at the last moment because of other priority meetings at the same time. There were P. Grard from IFP in India, Fasil Reda from PCP in Ethiopia, Mrs. M. Murata from CCARDESA in Botswana, B. Isabirye from ASARECA in Uganda, E. Jeuffrault Director of Cirad in La Réunion, Mrs N. Boura M'Colo Director of the Chambre d'Agriculture et de la Pêche of Mayotte, and the French Embassy in Comoros.

Some 63 people attended the opening ceremony while 51 people participated in the entire workshop. Journalists from Comorian news-papers, and TV (La Gazette des Comores, ORTC) were also invited to report about the workshop.



Fig.3: Opening ceremony (© P. Marnotte - Cirad)

The workshop was introduced by the Director of Cabinet of the Minister of Agriculture of the Union of Comoros and Mrs. Batouli Said Abdallah Deputy Director of CNDRS, and Dr Thomas Le Bourgeois, project leader from CIRAD (fig. 3).

Various points were presented and discussed during the workshop:

- The challenge of weed management in Africa for the FAO⁹

¹ CIRAD : Centre de coopération internationale en recherche agronomique pour le développement (France)

² MCIA : Mauritius Cane Industry Authority

³ MSIRI : Mauritius Sugarcane Industry Research Institute

⁴ FOFIFA : Centre National de la Recherche Appliquée au Développement Rural (Madagascar)

⁵ CNDRS : Centre National de Documentation et de Recherche Scientifique (Comores)

⁶ IFP : French Institute of Pondicherry (India)

⁷ PNUD : United Nation Development Programme

⁸ GEF : Global Environmental Facility

⁹ FAO : Food and Agriculture Organization

- The WIKWIO project and its objectives;
- The tools of the project (e.g. Participatory portal, identification tool, and mobile apps);
- Weed species list and information managed, according to countries and cropping systems;
- Training of participants in the use of tools and data management in the portal;
- Collaboration opportunities;
- Administrative and financial aspects of the project, for partners only.

Partners

The WIKWIO project is coordinated by CIRAD in collaboration with 4 partners (MCIA/MSIRI, FOFIFA, CNDRS and IFP). CIRAD was represented at the workshop by Thomas Le Bourgeois (weed scientist and project leader), Nora Bakker (management assistant), Pascal Marnotte (weed scientist). Four other Cirad people from La Réunion Island could attend the workshop: José Martin, Jean Luc Brossier and Alix Rassaby from sugar cane team), and Rose-My Payet from Orchard team in Réunion Island. Trip and expenses of three of them were paid by local funds from Cirad in La Réunion, showing the particular interest they have in this regional project. MCIA/MSIRI was represented by Azaad Gaungoo (weed scientist). FOFIFA was represented by Alain Paul Andrianaivo and Jean Augustin Randriamampianina (weed scientists). CNDRS was represented by Yahaya Ibrahim (weed scientist), Faina Hadji (technician) and other people from CNDRS. IFP was represented by Ramesh B.R. (botanist) and Sathish Kannan (computer developer).

CNDRS had invited people from Eastern and Southern Africa with whom collaborations already exist or because these persons had any interest in the project for further collaboration. There was Hestia Nienaber from South Africa (ARC Agricultural Research Center). Unfortunately other invited people could not come. The weed officer at the FAO, Gualbert Gbehounou, was also invited. It was an excellent opportunity to show him how the project is ongoing with the partners, and to benefit from his experience in weed management in Africa and strategy to enlarge the collaboration throughout Africa.

A number of Comorian people from the different institutions involved in crop production, crop protection, extension services, Ministry of agriculture, University of Comoros, Herbarium, NGOs, farmer representatives took part in the workshop.

Researchers, assistants and trainees from CNDRS also attended the opening ceremony and/or the workshop..

The list of participants is presented in Appendix 2.

Weed management challenges in Africa and future prospects

A survey conducted by FAO in thirteen countries Africa-Wide, including Madagascar, revealed weed management challenges facing the continent. Critical issues reported include shortage of labour, predominantly assured by women, and as a consequence an increasing use of herbicides. The herbicide selection pressure has induced occurrence of resistant weeds, for example in Morocco and South-Africa. Herbicide resistant weeds include *Lolium rigidum*, *Papaver rhoeas* and *Echinochloa phyllopogon*. Alien invasive weeds are spreading on the continent with great economic damage inflicted by *Solanum elaeagnifolium* to countries in Northern and Southern Africa. Eastern Africa is

invaded by *Prosopis juliflora* and *Parthenium hysterophorus*. In addition to alien invasive weeds there is a long list of noxious weeds contaminating crop seeds. Among them are parasitic weeds of the genera *Striga*, *Rhamphicarpa*, *Orobanche* and non parasitic weeds such as *Ischaemum rugosum*, *Oryza longistaminata* (wild rice), *Oryza barthii* (wild rice), *Rottboellia cochinchinensis*, *Ageratum conyzoides*, *Argemone Mexicana*, *Avena fatua* to name but a few. In this context, weed management challenges must be addressed at several levels. At community level, integrated weed management should be designed to reduce use of herbicides and weed management cost. The best way to achieve this is to involve farmers and other stakeholders in the innovation process, to ensure that not only acceptable but accepted technologies are delivered. This requires a new innovation paradigm. At national level a conducive environment must be created by policy makers to support successful integrated weed management efforts at community level. At regional level partnership is needed at both technical and policy level for management of invasive weeds. It is now time to develop an Africa-wide strategic framework and an implementation plan for invasive weeds. Research should focus more on development of non-herbicide, alternative weed management innovations compatible with sustainable crop production intensification. There is a need for weed scientists to interact more, Africa-wide.

Gualbert Gbèhounou Weed Officer, FAO HQs Rome
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Discussion synthesis

Number of activities in weed science has been done in South Africa. A Weed Science Society of South Africa already exists and could efficiently collaborate to a global approach at African level. The FAO is already organizing training activities in weed risk management at national or sub-regional level in Africa throughout its network of local or regional FAO representatives. We really would like to create a direct link with the Wikwio project, because this project perfectly meets the need to share knowledge for a better risk assessment and a better adaptation of management recommendations. Exotic invasive weeds and quality of seed production are good entry points to sensitize policy makers in the challenge represented by weed management in crops. The use of cover crops is a way to control weeds but some species used as cover crops can also become invasive plants. This is the case here in Comoros where some creeping plants have been tested in agroforestry but became invasive in banana or clover crop. Cover crops and invasive plants have similar characteristics. This is the reason why their selection and use need the participation of farmers and a good knowledge of the conditions where they are beneficial or not. For example, *Ipomoea batata* and *Cajanus cajan* can be used as cover crop as well as crop but before diffusing the use of a cover crop it is necessary to evaluate the local or regional risk by a WRA (Weed Risk Assessment). Such a WRA should be explained and practiced as well as the use of Wikwio in the CRE (Economical Rural Centers) which are emerging here in Comoros. The GEF project on agriculture and climate change in Comoros and the local representative of the FAO based in Madagascar could contribute together in facilitating trainings on such topics in Comoros.

Presentations of the project and tools

1 The WIKWIO project and its objectives

Relevance of the action

- Agriculture is the mainstay of the livelihoods of population in the Island states of the Indian Ocean, and South Eastern African region too.
- Weeds cause enormous economic loss in food and cash cropping systems.

- Optimisation of weed management can result in significant boost of production.
- WIKWIO will focus on weed knowledge and management through informed scientific and technological approach.
- Limited production due to ineffective control of weeds (responsible to 20-80 % of yield losses).

Relevance of the proposal

- New science and technology framework:
 - Weed research
 - Weed management in food and cash cropping systems
- Centralised platform of information on weeds.

Specific objectives

- Consolidation of existing scientific knowledge for the weed species of food and cash cropping systems.
- Enhancing exploitation and dissemination of best weed management practices.
- Support the stakeholders in their use of Web 2.0 tools and improve the tools based on their feedback.

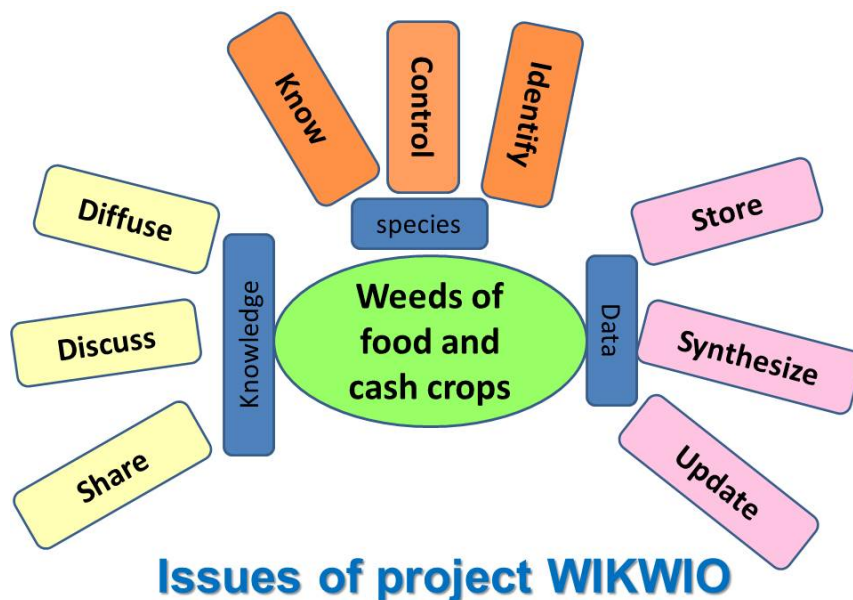


Fig. 4: Issues of the WIKWIO project

Outputs and expected results

- Established and consolidated network at Western Indian Ocean level.
- Fully functional web portal on weeds combining:
 - ✓ Public access / Members working groups;
 - ✓ Network management;
 - ✓ Field observations;
 - ✓ Weed identification;
 - ✓ Weed information;
- Tools available on several kinds of devices.
-

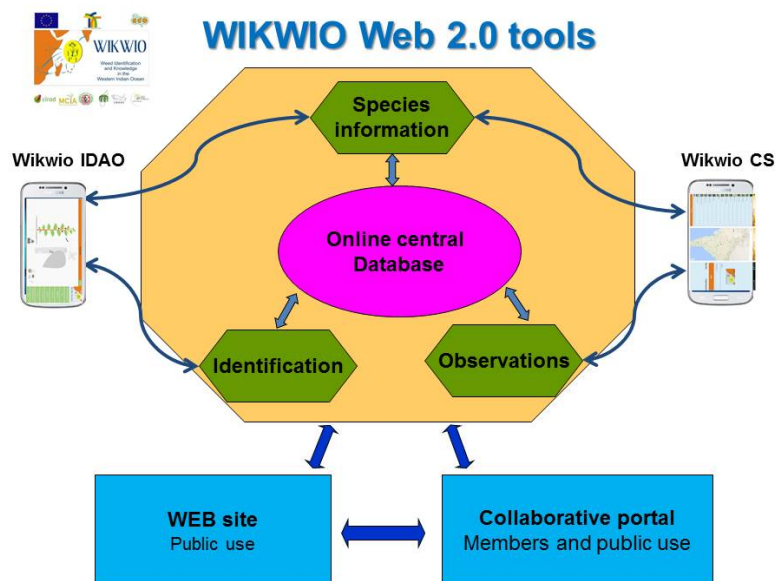


Fig.5: Combination of computer and mobile tools of the WIKWIO project

Project activities

1. Regular workshops with partners and stakeholders.
2. Compilation of existing knowledge resources.
3. Integration of various datasets and implementation of the knowledge base (identification, information and control measures).
4. Dissemination sessions, feedback and improvement of the WIKWIO Web2.0 portal.

2 The WIKWIO participatory portal

The participatory portal of WIKWIO is a Web-2.0 collaborative space for both public and members of the WIKWIO project (fig. 6). It is available at <http://portal.wikwio.org>

It allows to:

- Consult or contribute to species information spreadsheets;
- Supply weed observations (e.g. field trips, weed control practices, unidentified weeds);
- Supply maps (the geo-referenced layers can be superposed on a Google physical or OSM base layer map);
- Share information, working documents, check lists of species;
- Access the IDAO identification tool online;
- Manage working groups on specific topics such as cropping systems (sugar cane, orchard...) or general topics (weed science, communication);
- Create, animate and participate to online discussions.

Any page, document or photo can be subject to comments for/from members of the portal. These comments will include the basis for exchanges between the partners.

At the moment the portal contents

- Pages of information for 347 weed species
- 4415 field observations among which 3035 have pictures

- 1 map
- 83 documents (protocols, guidelines, technical)
- 4 check lists corresponding to tables of weediness of the weed species according to the main cropping systems of each country
- An IDAO identification tool for the 345 weed species, available online

This portal is for public consultation but participation and contribution in this portal requires registration. Registration is totally open but participation to groups or contribution to species pages is validated by the project coordinators to prevent actions from people with other intentions (e.g. people that are clearly not associated to agriculture, weed management or botany).

After two years of existence there are 344 members registered on the portal.

The bilingual French/English is fully available.



Fig. 6: Home page of the bilingual WIKWIO portal

The workshop participants have been trained in the use of this portal and are now able to present it in their professional networks and seek new registrations.

3 The WIKWIO IDAO identification system

IDAO identification of weeds using the identikit tool enables the identification of an actual set of 345 weed species of cropping systems in the Indian Ocean at any stage of development or from incomplete samples, without requiring prior knowledge in botany or taxonomy (fig.7). Moreover, this process is less sensitive to errors than a classical identification-tree, where one mistake can lead to a completely wrong identification.

Species are listed in order of probability of consistency with the information provided by the user.

All the species are fully described in French and part of them in English, with information on its origin, distribution, ecology and weediness, control methods used, sources (references), and are abundantly illustrated.

IDAO is a working tool for science and research, but can also serve as a pedagogical means for the dissemination of knowledge and a proven capacity building tool which can be used effectively for teaching and training in weed taxonomy for the scientific community. It is accessible from the WIKWIO portal and website.

Several versions will be developed during the project for any kind of use according to the location, the device used and the Internet connectivity:

- A CD-rom for use on computer offline.
- A SVG version for online use with computer, tablet or smartphone with 3G+ or WiFi connection from the website and the portal of the project.
- An off-line encapsulated version for tablets or smartphone use without 3G+ connection

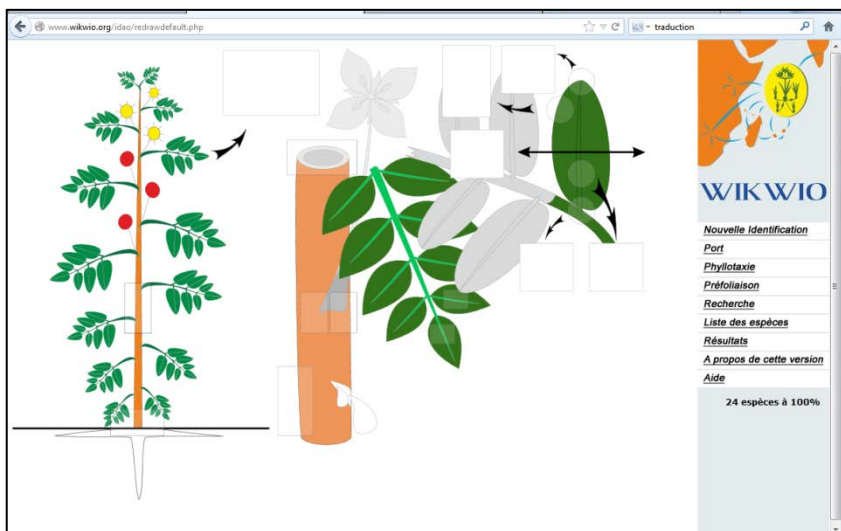


Fig. 7: Screen shot of the WIKWIO IDAO identification tool

4 The WIKWIO species database

The online Database of WIKWIO is directly managed under the portal of the project. This enables online and multi-user data management.

Species pages are available in English for 140 species and in French for 327 species. Species pages will be completed all along the project.

4415 observations among which 3035 have pictures and more than 10 000 images are already stored in the WIKWIO database.

Discussion synthesis

How analyzing the feedback of users?

There are three ways for analyzing the feedback of users. First one is the statistics of visit of the portal (number of visitors, number of pages visited, and duration of visits...). Second one is the contribution of members on the portal (number of observations posted, documents shared, comments, discussions...). We know from other quite similar projects that only 5 to 10 per cents of members are significantly contributing. Finally, surveys will be conducted among users and actors in Mauritius, Comoros and Madagascar to collect and analyze their opinion, use and feedback in order to improve the tools.

What mechanisms are used to inform those who are not yet involved in the project?

Communications at international conferences (EWRS, TDWG), Webnews, IUCN and EPPO information letters, papers in public science journals, newspapers, TV were used to inform about the project. Even if the Phytosanitary Bulletin of FAO no longer exists, it is possible to use the FAO network of national and sub-regional coordinators, the Regional Initiatives on Sustainable Agriculture and also the training activities on Ecological management of Weeds to spread the information on Wikwio. In Comoros, In Madagascar and in Mauritius, but also in France at Montpellier SupAgro, lectures for presenting Wikwio are organized at Universities and Agronomical schools.

About weed management, how do you manage recommendations?

The biggest challenge in weed management recommendation is to be up to date. Wikwio is offering the possibility to members to share their practices in weed management. These practices are considered by country and cropping systems. From this knowledge, the users can elaborate their own practices according to their agro-ecological situation, crop and weeds. The information on the portal can be updated in real time, which is very important.

Elaboration and discussion on the list of weed species and information

A list of 320 species was established during the launching workshop and concerning 14 cropping systems of the region. Along the first months of field surveys in the countries a new set of 25 species have been added for a weed flora of **345 species**. Other new species have been collected recently in Madagascar, Comoros and Mauritius which can be added in the database. A complementary list of about 70 species from Madagascar has been sent to all partners, including Réunion Island and South Africa, for evaluation, completion and prioritization.

Training activities on the use of Wikwio tools

Madagascar

Several activities were carried on in order to sensitize target people in Madagascar, to strengthen collaborations in between people working on weeds and capacity building of researchers and technicians.

- For a public audience, a conference-debate at IFM (Institut français de Madagascar) on the subject “New technologies meeting the rural world” was organized with A. P. Andrianaivo as invited people presenting the role of Wikwio in the Malagashy situation.
- Wikwio was also presented during the “Journée de l’Agro” (Agronomical school) a meeting between students and scientists.

- Wikwio was used during a training session for trainers (Module of professional training MFP3) in the domain of control of pest and weeds in agro-ecology and conservation agriculture.
- A master student from EESS (R. Tahiana) is supervised by Wikwio team in her study “Weed survey in cropping systems in the Mahanoro region (East Cost of Madagascar)”.
- An Engineer student (RAKOTONIRINA Santatriniaina) supervised by Cirad team at Madagascar and Montpellier in his study “ Rice Weeds in Medium West of Madagascar”.
- The IDAO identification process of Wikwio has been tested at school with four groups of children. They identify correctly a species with an average of 4 characters in 2 to 3 attempts. The conclusion from this test was that IDAO is very easy to use for people with intuitive mind. A similar test carried on with technical agents from the Center of Agricultural Services at Mahanoro, showed the difficulties that middle age people are facing in the use of a tablet.

Madagascar is facing the degradation of the National Agricultural Extension System for more than 10 years. It is progressively replaced by the Center of Agricultural Service which constitutes a platform of consultancy. Those technicians are the main target people to be trained in the use of Wikwio. This is why we are training them directly at the University or school during their studies. In Madagascar, the only limiting factor is the electrical and Internet outages.

Mauritius

In Mauritius the main training activities have been focused on agronomists from big sugar cane estates, extension officers from the Ministry of agriculture who help small farmers and researchers from MSIRI.

- We also trained extensionists working on food cropping systems and Service providers and technicians from phytosanitary industry.
- We have had lectures at the University of Mauritius for students and conferences at the Training center of MSIRI for students coming from other African countries.
- Two students from UOM (University of Mauritius) did a 2 month scholarship (July-August 2015) on Wikwio use (collecting weed samples, photos and posting observations to the portal).
- We are supervising a BSc student (Peerbaccus Bibi) in her scholarship study “Assessing the adoption and use of the internet WIKWIO portal as a tool for identification and weed control in Mauritius”.

Right now, about 75 people have been trained in the use of Wikwio tools.

Comoros

- Supervision of three students. “Weed mapping of vanilla and Ylang Ylang crops at the middle of Grande Comore island.
- Training of technicians and extension people in the collecting of weeds and in the use of Wikwio tools (8 people at Grande Comore and 10 people at Mohéli).
- Collaboration with lecturers from the University of Comoros who are training students in the use of Wikwio portal and IDAO identification tool. All BSc students in biology are aware and have the practice of using Wikwio.
- A 13 mn video documentary has been published. It presents the weed management problem in Comoros and the Wikwio project. This documentary will be soon available on YouTube and from the Wikwio portal.

The actors trained have a very limited initial background in botany. In addition, we face the problem of energy availability and the Internet. We are seeing how to use the cyber-café in remote areas far from Moroni. We will begin to use mobile applications.

Coming from nothing, we are arriving directly to Web2.0. It appears necessary to provide a field manual on Comorian weeds. We are therefore planning to publish a field guide for the 100 most important weed species of Comoros. Mr Mohammed Youssouf Coordinator of the GEF project on agriculture and climate change in the Comoros agreed to finance this manual.

Africa

Centre for Coordination of Agricultural Research and Development for South Africa (CCARDESA <http://www.ccardesa.org>) is an associate of the Wikwio. Agricultural Productivity Program for Southern Africa (APPSA) of CCARDESA aims to improve the availability of agricultural technologies within and across SADC countries which synergizes with the objectives of the Wikwio project, which aims at building a science and technology network of stakeholders in agriculture focusing on weeds in the region.

CCARDESA offered to organize two training sessions covering three countries of Zambia, Malawi and Mozambique which were held in Lusaka on 10th and 11th August 2015 for Zambia and on 13th and 14th August 2015 in Lilongwe for Malawi and Mozambique.

The Wikwio team consisted of Dr. Azaad Gaungoo, MSIRI, Mauritius and D. Balasubramanian, French Institute of Pondicherry.

The training program in Zambia was organized by the APPSA team based at the Zambia Agriculture Research Institute of the Ministry of Agriculture and Livestock, Government of Zambia. The training program was held at Sandy's Creations Conference Centre and was attended by over 50 participants consisting of scientists in agronomy, soil and plant breeding, academicians from University of Zambia and extension officers.

The training program in Malawi covering both Malawi and Mozambique was organized by the APPSA team based at the Department of Agricultural Research Services (DARS), Ministry of Agriculture, Irrigation & Water Development, and Government of Malawi. The training program was held at Chitedze Research Station conference hall and was attended by around 15 participants from Malawi and 12 participants from Mozambique consisting of scientists in agronomy, seed production, plant breeding and entomology, communication officers, extension officers working in maize, rice, coconut, groundnut, cassava and vegetables.

All trainees were requested to patronize the wikwio portal and help popularize it in their respective sectors and countries.

A. Gaungoo from MSIRI organized a training session on the use of the Wikwio portal for the 20 technicians of the sugarcane estate of Zouenoula in Côte d'Ivoire, during his mission for training on weed management (1-2 June 2015).

P. Marnotte from Cirad presented the Wikwio portal to the agronomists and technicians of the SUCAF CI (Sucrerie d'Afrique de Côte d'Ivoire), a sugarcane estate at Ferkessédougou (Côte d'Ivoire) in May 2015 and at the CSS (Compagnie Sucrière Sénégalaise) at Richard-Toll (Sénégal) in June 2015.

South Africa

Hestia Nienaber from ARC had an important activity on popularization of the Wikwio project in South Africa all along the year 2015.

- Oral presentation at the Combined Congress, hold in George (Western Cape) in January 2015. This congress includes members of four societies of South Africa, namely Soil Science, Horticulture, Crop Production and Weed Science. It gathered more or less 400 attendees. The title of the presentation was: “The use of Wikwio for identification of weeds in South Africa”.
- Articles were wrote and published in popular press, mostly read by producers, chemical agents and chemical companies, or published online at http://www.agtag.co.za/view_shared_post/3776 (see appendix 6)
- A radio talk was done on the project Wikwio, but the talk was broadcasted throughout South Africa. (**Wikwio-program vir onkruididentifikasie Hestia Nienaber** deweth@arc.agric.za)
- WIKWIO was also mentioned at all farmers’ days she attended, and was presented to fellow colleagues at ARC and outside.

La Réunion Island

Several activities have been carried on in La Réunion Island using the portal Wikwio

- Engineer student (Mélodie Ollivier) from Agro Campus ouest, has been supervised by F. Lebellec from Cirad (UR ORTSYS) in her study “Survey of the spontaneous flora in citrus orchards in La Réunion”.
- BSc student (Joelle Dijoux) from La Réunion University and supervised by J. Martin from Cirad (UR AIDA) “a user guide for the Wikwio portal”.

Training participants in using of the weed identification, posting observations directly from the field with mobile apps and taking photos of weeds

A field trip was organized on the third day at Ivembeni farm where an integrated production of vegetables is practiced. We spent the day in collecting weed samples and photos in the different fields. (fig. 8).



Fig. 8: Collecting weeds and pictures at Ivembeni farm (©A.P. Andrianaivo - FOFIFA)

We also demonstrated identification using IDAO with tablet (fig.9) and the collecting of observation and direct posting to the portal using the mobile app Wikwio CS on a 3G+ tablet (fig. 10).



Fig. 9: Identification and consultation of species page using Wikwio IDAO on a 3G+ tablet (© T. Le Bourgeois - Cirad)

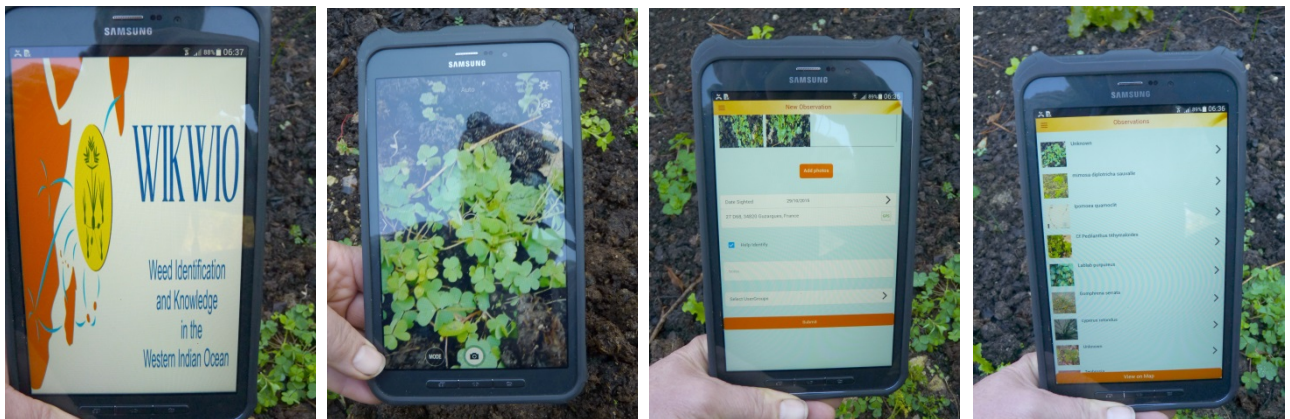


Fig. 10: Observation directly posted to the portal from the field with Wikwio CS on a 3G+ tablet and consultation of observations posted (© T. Le Bourgeois - Cirad)

Training partners in uploading their observations in the portal

The fourth day of the workshop was dedicated to the training of workshop participants in uploading observations in the portal. Participants learned how to record in the online database of the portal, observations and photos collected in the field. They were also trained to provide information, comments or identification on photos of unidentified or misidentified species (fig. 10).



Fig. 10: Training session on observation uploading (© P. Marnotte - Cirad)

Administrative aspects of the project WIKWIO

Several sessions with project partners, were organized and managed by Nora Bakker (Project administrative assistant). They prepared the financial closure of the second year of the contract Wikwio. N. Bakker also collected and verified accountings and proof documents from all the partners.

The fifth day involved only the project partners as well as G. Gbèhounou from FAO, H. Nienaber from ARC in South Africa and people from Cirad in Réunion Island. This meeting day was devoted to debrief the workshop, discuss the schedule of activities and remember the administrative rules to be followed in the preparation of the narrative and financial interim report.

Finally, we concluded this work by a meeting with the Deputy Director of CNDRS, Mrs. Batouli Said Abdallah. We expressed all our gratitude for the excellent organization of the workshop by the CNDRS team and the very good participation of Comorian actors.

Schedule of activities until the closing technical workshop in Madagascar

The closing workshop of the project is planned to take place in October 2015 in Madagascar, organized by FOFIFA team.

Several activities have been scheduled till October 2016:

- Prepare the report of the third technical workshop: November 2015 (CIRAD, IFP, MSIRI, FOFIFA, CNDRS).
- Visit of T. Le Bourgeois at IFP (India) November 2015, to work on the annual narrative report, on the improvement of tools and to elaborate a new proposal for a second phase of Wikwio project extended to all Africa in collaboration with FAO.
- Prepare the annual interim narrative and financial report (CIRAD, MSIRI, IFP, FOFIFA, CNDRS) 20-11 to 19-12-2015.
- Prepare a request to ACP ST II secretary for a reallocation of the budget balance which will be precisely evaluated after the second year financial report validated and a two month extension of the project (CIRAD)
- Review and update species pages already existing in the portal (CIRAD, IFP, MSIRI, FOFIFA, CNDRS).
- Prepare new species synthesis (CIRAD, MSIRI, CNDRS, FOFIFA).
- Add new weed species in the database (MSIRI, FOFIFA, CNDRS, CIRAD).
- Translate species information from French to English (MSIRI, IFP).
- Collect species information (biology, ecology, weediness, control methods), herbarium specimens, photos: permanent process (partners and members).
- Upload species information, observations and photos in the portal: (partners and members).
- Information layers will be uploaded in the mapping module of the portal. Some of these layers are already available at MSIRI GIS unit for Mauritius and at Cirad GIS Unit for La Réunion.
- Prepare the closing technical workshop in Madagascar in October 2016 (FOFIFA, Cirad and partners).
- Organize training sessions in the use of the Wikwio portal with CCARDESA, ASARECA and FAO (IFP, MSIRI).
- Organize training sessions with local actors in each country of the project (CNDRS, MSIRI, FOFIFA) and others.
- - o Madagascar
 - A master student is planned to work on “Floristic diversity and characterization of seedlings of weeds in cropping systems of the Miaramivato district.
 - 9 training sessions are scheduled at the Agricultural school, University – Faculty of agronomy,
 - Link with FAO coordinator in Madagascar to organize other local training activities.
 - o Mauritius
 - Continuing training activities for agronomists of sugar cane estates after the harvesting season
 - 8 hours of teaching are scheduled at the University

- Continuing the study of appropriation and use of the portal by stakeholder
- Comoros
 - Continuing training activities for extension people
 - Initiating a study on appropriation and use of the portal by stakeholders
- La Réunion Island
 - In La Réunion Island, the socialization of WIKWIO tools with stakeholders (including technicians but also farmers and agricultural education) is written into the 2016-2018 programme at the DPP SIAAM (sugarcane and fodder). This socialization will be carried on by Cirad people in partnership, particularly with RITA (Network for innovation and transfer in agriculture), including RITA Sugarcane (non-exclusive).
 - A user guide for Wikwio portal will be finalized
- South Africa

Until now, only 5 people from South Africa are registered in the portal Wikwio. But there are people with a lot of knowledge on weeds in this country. One of our main problem on weeds is about resistance of *Lolium* sp. to herbicides transferred to weed populations by hybridization. We also are surveying weeds flora all around the country. The next step of this work is to share the information, which not yet a common approach. Wikwio can help for that, and students have to be trained in its use.

- Training of ARC technician in the use of Wikwio to contribute with knowledge on weeds in South Africa
- Presenting Wikwio at the Faculty of agronomy of Pretoria University
- Africa
 - Collaboration with CCARDESA and ASARECA will continue in the organization of trainings.
 - G. Gbèhounou (FAO) explained that the southern African region has opted for Conservation Agriculture - where weed management is a major issue - as a model for sustainable agricultural production. He is sure that national and sub-regional representations (Harare) of FAO will be very interested in Wikwio training activities. They can make available technical resources (room, Internet). It is therefore necessary to consider these possibilities in the upcoming training in Africa. He will give the contacts.
- Forward Wikwio portal to the cloud for a better maintenance and efficacy (IFP).
- Communicate on the Wikwio project and tools (every partners and members).
- Participate to the TDWG (Taxonomic Data Working Group) 2016 in November in Costa Rica and present the results of the Wikwio project. This could be possible if the project is prolonged and the budget balance reallocated.
- The monthly video meeting of partners will continue.

Feed-back from workshop participants on tools and opportunities for developing other collaborations around and outside the WIKWIO project

During the last session, discussions on the project and tools (identification, participatory portal) highlighted several points for the improvement of the tools and showed several opportunities of collaborations from participants. The future of the project after the funding by ACP ST II has also been widely discussed with very interesting prospects in collaboration with FAO.

Improvement of the tools

For the long-term maintenance of the portal and for facilitating its hosting, it has been decided to forward the Wikwio portal to the cloud.

Portal

- In the portal, the management of Taxonomical hierarchy has to be finalized.
- Adding new fields to fill in during weed observation (portal and Wikwio CS) such as Abundance, Phenology and Crop. This info could be mapped using color and symbols. This will facilitate the visibility and the analysis of the distribution, weediness and seasonality of species.
- Adding the selecting filters Life form, Biology and Habitat with icons for observations and species pages. The same characters are used in the IDAO.
- Adding an illustrated botanical glossary (Fr and En) in the pages "More" and a button for direct link on Species pages. This glossary will highly contribute to help users in understanding technical words used in the Species pages and will also contribute in capacity building in botany.
- New fields of information will be added in Species pages. It concerns particularly the hosting of natural regulators of crop pests for agro-ecological purpose. It appeared from the discussion that it is very important to mention which weed species are favorable hosts for auxiliaries and the morphological or physiological features they have to fulfill this role (domatium, hairiness, nectar, flower shape or size or color, venation etc.). In the field on weed control, mowing practices will be added for cover crop management in orchards including spontaneous plants such as weeds.
- Right now, in an observation when both common name and scientific name are filled in, the common name is used in priority. The reverse should be done.
- A user guide of the portal will be completed and made available for tutorial.
- Links with MBG (Missouri Botanical Garden) Species pages will be managed from Species pages and also at home level of the portal.
- Until now, after some time disconnection from the portal is automatic. This can happen even during filling a Species page or working on the portal. This disconnection should occur only after a certain time without any activity.
- Allowing the sorting of the list of members by date of registration.
- Allowing the export of Species pages in CSV format
- Allowing to create subpages in the Webpages

IDAO

- On the right column of the screen there are both characters for identification (Habit, size of leaf, phylotaxy) and other actions (new identification, research, results, list of species, about, help). These two categories of actions should be better differentiated.

- When using the Research button for selecting automatically the better character to separate the group of species having 100% of probability. When opening the character with all modalities, the relevant modalities, according to the group of species concerned, should be highlighted to facilitate the user choice.

Mobile apps

- A bilingual version (Fr and En) of Wikwio CS has to be released
- On Wikwio CS and Wikwio IDAO mobile apps: Prompting a message for the user to update the app if he has an older version and offer the possibility to update now or later.
- On Wikwio CS, when the observation is uploading, the status of the observation will be changed from pending to processing and then to success/failure. Submitting of new observation is made via database. A new observation when submitted comes to database with status as pending and if there is internet it will be submitted if not it will be in queue.

Opportunities for collaborations

In Madagascar and Comoros

Fofifa and CNDRS partners will get contact with FAO national coordinator in Madagascar in order to evaluate how they can contribute to FAO training and development programmes on sustainable agriculture.

In Comoros

CNDRS partner will analyze the opportunities of collaboration with EU local activities in agricultural training and GEF project on agriculture and climate change. A field guide of the major weeds of Comoros will be prepared with support of the GEF project.

The round table on weed management in Comoros, previously scheduled in October 2015 has been delayed to December 2015. This will be an opportunity for sensitization of policy makers and local stakeholders on the challenge represented by an efficient weed management.

In the extended area of the project

Collaborations with CCARDESA (namely the APPSA programme) and ASARECA will continue for regional training activities. Coordinators from IFP and MSIRI will take charge of this regionalization of the project.

In South Africa, Hestia Nienaber will present the Wikwio project at University of Pretoria (Weed science laboratory). She is supervising a survey on arable weeds in South Africa. This data will contribute to the portal. She will continue to publicize on the project.

Globally FAO has 5 Strategic Objectives:

- 1 Eradication of hunger, food insecurity and malnutrition
- **2 Make agriculture, forestry and fisheries more productive and sustainable**
- 3 Reduce rural poverty
- 4 Enable inclusive and efficient agricultural and food systems
- 5 Increase the resilience of livelihoods to threats and crises

Clearly, the Wikwio approach fits perfectly with the Strategic Objective 2.

Strategic Objective 2 has 5 Thematic Areas:

- **1 Ecosystem Services and Biodiversity**
- 2 Climate Smart Agriculture
- 3 Blue Growth
- **4 Efficient Use of Resources**
- 5 Common Vision on Sustainable Food and Agriculture

The Wikwio approach fits perfectly with both the Thematic Areas 1 and 4.

FAO and national governments have defined a Country Programming Framework (between FAO and member countries) that records the activities for which FAO helps the country.

The Strategic Objective 2 (Sustainable agricultural production) is implemented through 4 Regional Initiatives. One of them is on: **“Sustainable agricultural production and intensification in Africa”**.

Furthermore, FAO is working with Results Indicators. Two of the Strategic Objective 2 indicators are on:

- Number of participatory initiatives that use inclusive and participatory approaches to validate and facilitate uptake of innovative practices for sustainable agricultural production
- Number of public and private knowledge organizations and institutions, management agencies and networks that receive organizational and institutional and/or technical capacity development support from FAO on the basis of assessed needs

The Wikwio approach contributes to both Indicators.

At present, the Wikwio member countries are in the southern region of Africa. We must therefore involve FAO national representations in these countries for training activities and the final workshop in Madagascar. But we also have to start actions of sensitization to other sub-Saharan African regions. Thus, FAO coordinators will be contacted, with the support of G. Gbèhounou, in order to introduce the Wikwio project and tools during regional training sessions on sustainable agriculture.

Meanwhile, the UN permanent resident in the Comoros, Mr. Leo Isidro Heileman, has proposed to disseminate the information about Wikwio to the various UN regional correspondents, particularly to IFAD which could be a financial partner for the future.

All of this would contribute to prepare the second phase of the project expanded throughout Africa, with a special emphasis on South-South collaboration and capacity transfer: **“ICT and Weed Identification, Knowledge, and Management in Africa”**.

Visibility actions

Flyers presenting the WIKWIO project in French and English (figs. 11 and 12) are available on the portal and can be distributed by participants through their professional network in their country.



Axis: Strengthen STI to enable creation and use of scientific knowledge

Result: National and regional capacities to devise and use STI programmes and their results are improved

Duration of the Project
36 months

Start date
November 21th 2013

For more information: <http://www.wikwio.org>

WIKWIO
Weed Identification and Knowledge in the Western Indian Ocean

Participating institutions...

- CIRAD :** French Agricultural Research Centre for International Development (CIRAD), France
- IFP :** French Institute of Pondicherry (IFP), India
- MCIA :** Mauritius Sugarcane Industry Research Institute (MCIA/MSIRI), Mauritius
- FOFIFA :** Centre National pour le Développement Rural (FOFIFA), Madagascar
- CNDRS :** Centre National de Documentation et de Recherche Scientifique (CNDRS), Comores

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A project funded by the ACP Science and Technology Programme (ACP S&T II).
An ACP-EU co-operation programme in the field of science and technology

Context...
The proposed action aims to contribute to enhancing the productivity of food and cash cropping systems and help improve food security in Island States of the Western Indian Ocean and South East African region. The selected cropping systems suffer from significant production losses due to weed infestations. The action aims at creating a science and technology network serving the farming, extension and research community to foster appropriate weed management practices.

Focus...
The project will strengthen the interdisciplinary approach of existing scientific knowledge on the management of weed infestations by creating a knowledge base of STI data on crop weeds of the area.

Justification...
Integrated weed management is considered the most appropriate option in crop protection to enhance harvests, through a choice of appropriate measures (cultural, mechanical, biological and chemical) to maintain weed below the threshold level.

Materials and Methods...
A project website has been launched to disseminate project description and scientific information on the crop weeds in Island states of the Western Indian Ocean and South East Africa. It will provide space for collaborative work between project partners through several tools such as forum, mailing list, document repository and access to the knowledge database on weed species. Existing knowledge on weed identification and control for the selected weed species is gathered in the WIKWIO knowledge base. All the documents and information related to the weed species (descriptions, photos, drawings and scans) will be prepared and integrated into the WIKWIO website. Workshops and local training sessions in the participating countries with agronomists, students and extensionists will be organized.

Expected Results...
A webportal hosting the comprehensive STI knowledge base on weeds and a citizen science collaborative space WIKWIO.
A database of knowledge on crop weeds of islands of the Western Indian Ocean and Southeast Africa.
A community of stakeholder around the WIKWIO platform, replicable and expandable to a larger region.

Fig. 11: WIKWIO flyer in English

Axe : Renforcer les STI pour permettre le développement, l'amélioration et l'utilisation des connaissances scientifiques

Resultat : Les capacités nationales et régionales pour concevoir et utiliser les STI et leurs résultats sont améliorées

Durée du projet
36 mois

Début
21 novembre 2013

WIKWIO
Weed Identification and Knowledge in the Western Indian Ocean

Pour plus d'information : <http://www.wikwio.org>

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WIKWIO
Identification et connaissance des adventices des cultures de l'Ouest de l'Océan Indien

Institutions partenaires...

Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), France

Institut Français de Pondichéry (IFP), Inde

Institut de Recherche sur l'industrie de la canne à sucre (MCIA/MSIRI), Maurice

Centre National pour le Développement Rural (FOFIFA), Madagascar

Centre National de Documentation et de Recherche Scientifique (CNDRS), Comores

Un projet financé par le programme ACP Sciences et Technologies (ACP S&T II)
Un programme de coopération ACP-EU dans le domaine des sciences et technologies

Contexte...
L'action proposée vise à contribuer à l'augmentation de la productivité des systèmes de cultures alimentaires et de rente et à améliorer la sécurité alimentaire dans les états insulaires de l'ouest de l'Océan Indien et de l'Afrique orientale et australe. Les systèmes de culture sélectionnés souffrent de pertes significatives de production causées par les infestations de mauvaises herbes. Le but est de créer un réseau scientifique et technologique au service de l'agriculture, du développement et de la recherche, pour faciliter le partage des connaissances et optimiser les pratiques de gestion des mauvaises herbes.

Gros-plan sur...
Le projet consolidera l'approche interdisciplinaire des connaissances existantes sur les adventices et la gestion des enherbements par la création d'une base de données STI pour la région considérée.

Justification...
La gestion intégrée des adventices est considérée comme l'option la plus pertinente en protection des cultures pour améliorer les rendements, au travers d'un choix de mesures appropriées (culturelles, mécaniques, biologiques et chimiques) permettant

de maintenir l'enherbement en dessous du seuil de nuisibilité.
Pour être efficace, la lutte intégrée contre une mauvaise herbe doit s'appuyer sur la connaissance de sa biologie et de son écologie.

But...
L'action vise à construire et utiliser une plateforme STI sur les adventices et les méthodes de gestion des enherbements, qui permettra de consolider les informations actuelles et facilitera le partage de nouvelles acquisitions scientifiques et techniques. Ce travail consistera à créer une base de données, la plus complète possible, sur les adventices de la zone géographique considérée. Il s'agira, d'autre part, de mettre en place une plateforme collaborative d'échange d'informations sur les adventices destinée aux acteurs concernés : chercheurs, agronomes, agents du développement, agriculteurs,

Matériel et Méthodes...
Un site Web présente le projet et diffuse l'information sur les adventices des cultures dans les pays d'Afrique orientale et australe et les îles de l'ouest de l'Océan Indien. Il est associé à un espace collaboratif pour les partenaires du projet mettant à disposition différents outils tels qu'un forum de discussion, un catalogue de documents et l'accès à la base de données sur les mauvaises herbes des cultures, un partage de photos, etc. Les connaissances disponibles sur l'identification des mauvaises herbes et sur la lutte contre ces espèces sont rassemblées dans la base de connaissances WIKWIO. Tous les documents et toute l'information concernant les adventices (descriptions, illustrations) seront intégrés au site WIKWIO. Des ateliers ainsi que des sessions de formation sont organisés localement dans les pays partenaires avec l'ensemble des acteurs (chercheurs, agronomes, étudiants, développeurs, producteurs).

Résultats attendus...
Un portail Web hébergeant une base de connaissance STI sur les adventices et la plateforme collaborative de science citoyenne WIKWIO.
Une base de connaissances sur les adventices des cultures des îles de l'ouest de l'Océan indien et de l'Afrique orientale et australe.
Une communauté d'acteurs autour de WIKWIO qui puisse être étendue à d'autres régions.

Fig. 12: WIKWIO flyer in French

Documents and supports used during the workshop (workshop schedule, invitation, banner, etc.) were all printed with the logos of the European Union and the ACP S&T programme and those of partners (figs. 13 and 14).



Fig. 13: Banner of the launching workshop (© P. Marnotte/Cirad)

Bags and cups with small Comorian gift (cloves and Ylang Ylang oil) were printed with the logo of the project, logos of the European Union and the ACP S&T programme, and those of partners and were distributed to participants (fig.14).



Fig. 16: Bags, cups and badges of participants during the workshop (© P. Marnotte / Cirad)

Journalists from TV, Radio, and Newspapers in Comoros were invited to attend the opening ceremony of the workshop. The list is presented in appendix 2.

Interviews with different coordinators or participants were performed by radios and TVs and presented during the TV news on 12/10/2015. Videos are available on the website of the project.

An interview by journalist of the Comorian newspaper “La Gazette des Comores” was also performed.

<https://www.youtube.com/watch?v=nsB0yc606Xs>

A press release has been distributed (Appendix 3)

An insert in “la Gazette des Comores” was issued on October 14. We sincerely regret that the financing of the project Wikwio by the ACP ST II programme of the European Commission was not mentioned despite the information provided (Appendix 4).

Conclusions

The third technical workshop of the WIKWIO project was very interesting and very well organized. The attendees were unanimous to say that the WIKWIO project and the tools address an important need for information on weeds of food and cash crops in the Western Indian Ocean. The combination of a Web portal with mobile apps should facilitate teaching, training and informing farmers and all stakeholders involved in agronomic activities.

There was a general feeling that this project is working well and contributing to facilitate communication between actors, and everybody was excited to contribute.

It is clear from all the discussions that Wikwio tools appear to be very useful for research, extension activities, training and teaching on weed science, agronomy, and botanic. The FAO's weed officer G. Gbèhounou appeared very enthusiastic about the approach and tools. He proposed to contribute in the awareness of people and the enlargement of the area concerned by the project in Africa.

Everyone was willing to continue the project as part of a second phase expanded throughout Africa. The preparation of this second phase with submission of new proposal to H2020 calls or to IFAD funding will be an important task during the last year of the project.

Acknowledgement

It was a great Honor to benefit from the opening speech of the Director of Cabinet of the Minister of Agriculture of the Union of Comoros. This participation demonstrates the importance of the project for Comorian policy makers.

The project coordinators of WIKWIO acknowledge Dr. Batouli Said Abdallah Deputy Director of CNDRS for the efficiency of the CNDRS team and the quality of the organization of the third technical workshop of the WIKWIO project at Moroni. In particular we herewith thank Yahaya Ibrahim and the technicians for their contribution in preparing this workshop and their availability during the course of it.

We would also like to thank Mrs. Conception Perez Camaras from the Delegation of European Union in Comoros, for participating to the welcome ceremony and for her offer of collaboration for training activities in agriculture in Comoros.

We also thank Mr. Leo Isidro Heileman, Coordinator of United Nation Systems in Comoros for his interest in the project and the very interesting discussion we had about opportunities of contribution of the UNS for the regional and African extension of the project.

Our sincere gratitude to Mr. Youssouf Mohammed, coordinator of the GEF/Comorian Gov. project on Agriculture and Climate Change in Comoros, for his agreement to funding the publication of the field guide on major weeds of Comoros.

Our special thanks also to Dr. Gualbert Gbèhounou, weed officer of the FAO HQS in Roma for his really appreciated participation to the workshop and his constructive proposals.

All the partners would like to thank the European Union (ACP Secretariat -Science and Technology Programme II) for funding the project WIKWIO through the tender of the 2012 10th European Development Fund.

Appendix 1: Programme of the Workshop



CNDRS

**Centre National de Documentation et de
Recherche Scientifique**

WIKWIO
Weed Identification and Knowledge
in the Western Indian Ocean

Third Technical Workshop

12au 16 October 2015

Retaj Hotel

Moroni, Comoros



PROGRAMME**Day 1 – 12 October 2015 (Retaj Hotel Hotel)**

8:30 - 9:15	Registration of Workshop participants
9:30 -10:30	Opening ceremony – Abdallah Nouroudine
10:30 -11:00	Coffee break
11:00 -12:00	Presentation of partners and visitors
12:00 – 12:15	Weeding, the challenge in Africa - G. Gbehounou, FAO
12:15 -13:30	Lunch
13:30 -14:00	WIKWIO presentation – Y. Ibrahim
14:00 -14:30	WIKWIO portal presentation – T. Le Bourgeois
14:30 -15:00	WIKWIO IDAO presentation – P. Grand
15:00 -15:30	Coffee break
15:30 -16:00	Mobile applications - (D. Balasubramanian, IFP)
16:00 -17:30	Administrative session (partners only)

Day 2 – 13 October 2015 (Retaj Hotel)

8:30 - 9:00	Weed management in Comoros – Y. Ibrahim
9:00 -10:30	Data management on the portal (Observations)
10:30 -10:50	Coffee break
10:50 -12:00	Data management on the portal (Species pages)
12:00 -13:30	Lunch
14:30 -15:30	Use of Wikwio-IDAO on mobile
15:30 -15:50	Coffee break
15:50 -17:00	Use of Wikwio-CS on mobile

Day 3 – 14 October 2015 (Firme de Bandasamlini)

8:30 -12:00	Field trip: visits to different cropping systems
12:00-13:30	Lunch
13:30 -17:00	Field trip: visits to different cropping systems

Day 4 – 15 October 2015 (Retaj Hotel)

8:30 -09:00	Wikwio training activities in Comoros – Y. Ibrahim
9:00 -9:30	Wikwio training activities in Madagascar – AP. Andr
9:30 -10:00	Wikwio training activities in Mauritius – A. Gaungoo
10:00 -10:30	Wikwio training activities in Africa – P. Grand

Coffee break

10:50 -12:00	Management of collected data
12:00-13:30	Lunch
13:30 -15:30	Use of the web site
15:30 -16:00	Schedule of the third year
	Collaboration Wikwio / FAO
18h:	Cocktail

Day 5 – 16 October 2015 (Retaj Hotel)

8:30 -10:30	African and Regional collaborations (partners and associates CCARDESA, ASARECA, FAO)
10:30 -10:50	Coffee break
10:50 -12:00	Debriefing session (partners and associates)
12:00-13:30	Lunch
13:30 - 13:45	Administrative session (partners only)
13:45 -15:30	Debriefing session (partners only)
15:30 -16:00	Coffee break
16:00 -17:30	Schedule of partner's activities (partners only)

Appendix 2: List of attendees



Fig. 17: Group photo of participants (©CNDRS)

ATTENDEES

N°	Name	Institution	Fonction/Speciality	country/Island	email
1	Abdillah Omar	Office de Radio et télévision de Ngazidja	Journaliste	Grande-Comore	omar@yahoo.fr
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Appendix 3: Press release



Communiqué de presse

WIKWIO

Weed identification and knowledge in the Western Indian Ocean

Un projet financé par
le Programme ACP Science and Technology II
de la Commission Européenne

Troisième atelier technique

12 - 16 octobre 2015
Moroni – Comores

Le projet WIKWIO

La sécurité alimentaire dans la région occidentale de l'Océan Indien et une partie importante de son économie dépendent principalement de la production agricole locale ou régionale. A titre indicatif d'après la FAO, aux Comores, la production de racines et tubercules est pratiquée sur 16 000 ha, les fruits (notamment la banane) sur 9 000 ha et les céréales (notamment le riz) sur 25 000 ha. Ainsi, l'agriculture génère environ 49 % du PIB, représente 80 % des emplois et près de 90 % des recettes d'exportation du pays avec en particulier la production d'épices comme le clou de girofle ou la vanille. Cependant, la production agricole, qu'il s'agisse de cultures vivrières ou de rente, souffre de diverses contraintes, notamment des mauvaises herbes. Les mauvaises herbes sont considérées comme une cause majeure de perte de production. Dans un contexte international de réduction des coûts de production et le développement durable, la gestion des adventices plus respectueuse de l'environnement est une préoccupation majeure pour l'ensemble des acteurs de la production agricole, aussi bien les agriculteurs et les vulgarisateurs que les agronomes, les chercheurs et les décideurs.

C'est pourquoi il devient prioritaire de faciliter le partage des connaissances scientifiques et techniques. Pour cela, il faut aborder collectivement les questions et les problèmes de gestion des mauvaises herbes au travers d'une communauté professionnelle.

Les nouvelles technologies de l'information et de la communication (TIC / NTIC), les bases de données en ligne, les systèmes assistés d'identification facilement disponibles sur le Web et les appareils mobiles nous donnent maintenant la capacité d'atteindre les objectifs du projet WIKWIO :

- Mettre en réseau tous les acteurs de la production agricole, de la recherche et de l'enseignement supérieur pour construire une communauté active autour du projet ;
 - Partager des connaissances sur les mauvaises herbes et leurs méthodes de gestion ;
 - Analyser collectivement les problèmes d'enherbement ;
 - Contribuer à renforcer les compétences scientifiques et techniques des structures locales de recherche, d'enseignement et de développement, grâce à la combinaison d'outils et d'informations ;
 - Intégrer l'initiative dans les cadres régionaux existants pour un impact soutenu à long terme.

Par conséquent, si chacun de nous à travers son expérience, apporte une fraction de son savoir dans le portail Wikwio, nous pouvons tous bénéficier de cette connaissance collective, qui est ainsi valorisée et disponible en temps réel et dans n'importe quel contexte professionnel (bureau, laboratoire, terrain). Cette connaissance est utilisable tant pour la prise de décision au champ ou à l'établissement de recommandations que pour l'enseignement ou pour l'élaboration de nouveaux projets de recherche.

Objectifs de l'atelier

Le troisième atelier technique du projet Wikwio a été organisé par le CNDRS, et s'est tenu pendant 5 jours (12-16 octobre 2015) à Moroni - Comores. Il s'agissait de la troisième réunion de tous les partenaires (Cirad-France, MCIA/MSIRI-Maurice, FOFIFA-Madagascar, CNDRS-Comores, IFP-Inde et institutions associées CCARDESA et ASARECA) avec les acteurs des SNRA, de l'université et des services de développement des Comores et des pays africains riverains de l'Océan Indien (Afrique du Sud) et de la FAO, de façon à assurer leur participation à la mise en œuvre de la plate-forme participative. Une cinquantaine de personnes ont participé à cet atelier.

Les outils, tels que l'identification assistée par ordinateur, le portail Web 2.0, la base de données en ligne, les applications mobiles pour téléphones portables et tablettes etc. ont été présentés et discutés.

Tous ces outils portent sur une sélection de 347 espèces de mauvaises herbes, prenant en compte les différents systèmes de culture des pays insulaires de la région.

Des sessions de formation ont été organisées pour la collecte, la gestion des données et la participation au portail collaboratif de WIKWIO.

Un programme de travail des activités des partenaires et collaborateurs a été établi jusqu'au l'atelier de clôture du projet qui se tiendra à Madagascar fin 2016.

Les résultats attendus du projet WIKWIO

- Un réseau régional S&T renforcé
 - Un portail Web 2.0 participatif sur la connaissance et la gestion des mauvaises herbes
 - Des outils d'identification et de connaissances disponibles pour plusieurs types d'appareils (PC, tablette, téléphone mobile) pour une utilisation au bureau ou directement sur le terrain, pour l'action, la recommandation, l'enseignement ou l'élaboration des politiques agricoles.

Site Web du projet: <http://www.wikwio.org>

Portail Web participatif: <http://portal.wikwio.org>

Coordination générale : thomas.le_bourgeois@cirad.fr

Coordination aux Comores : yahayaim@yahoo.fr

Appendix 4: Inserts of the project in National News Papers

LGDC du mercredi 14 Octobre 2015 - Page 4

AGRICULTURE

Se mettre ensemble pour lutter contre les mauvaises herbes

Le troisième atelier technique du projet Wikwio se tient pendant 5 jours (du 12 au 16 octobre) à Moroni. Le but des différents partenaires est d'assurer la mise en œuvre de la plate-forme participative sur les questions et les problèmes de gestion des mauvaises herbes au travers d'une communauté professionnelle.

« La sécurité alimentaire dans la région occidentale de l'Océan Indien et une partie importante de son économie dépendent de la production agricole locale ou régionale. A titre indicatif d'après la FAO, aux Comores, la production de racines et tubercules est pratiquée sur le 16.000 ha, les fruits (la banane) sur 9.000 ha et les céréales (notamment le riz) sur 25.000 ha », s'agissant des Comores.

L'organisme onusien précise que l'agriculture du pays génère environ 49% du BIP, représente 80% des emplois et offre près de

90% des recettes d'exportation avec en particulier la production d'épice comme le clou de girofle ou la vanille.

D'après l'expert Thomas Le Bourgeois, la production agricole, qu'il s'agisse de cultures vivrières ou de rente, souffre de diverses contraintes, notamment des mauvaises herbes considérées comme une cause majeure de perte de production. « Il devient prioritaire de faciliter le partage des connaissances scientifiques et techniques sur cette lutte », a dit l'expert.

Pour Thomas Le Bourgeois, si

chacun des acteurs apportait une toute petite part de son savoir dans le portail Wikwio, tout le monde pourrait bénéficier de cette connaissance collective valorisée et disponible en temps réel et dans n'importe quel contexte professionnel.

« Cette connaissance, a dit l'expert français, est utilisable pour prise de décision au champ ou à l'établissement de recommandations, pour l'enseignement ou pour l'élaboration de nouveaux projets de recherche ».

A en croire, les participants, le projet Wikwio va bien créer un réseau régional S&T renforcé et un portail Web participatif sur la connaissance et la gestion des mauvaises herbes, ainsi que des outils d'identification et de connaissances disponibles pour plusieurs types d'appareils.

Ibrahim Ali (stagiaire)

[06 Atelier Agricole CNDRS fr.mpg](#)

Published on Oct 14, 2015

Communication on Comorian National TV

On 12th of October News Bulletin 20h30 and 21h30 of ORTC

Appendix 5: Inserts of the project in South African News Papers

AGRI-INFO

The WIKWIO project: A tool for weed identification

Weeds cause enormous economic losses in food and cash cropping systems. The optimisation of weed management can result in a significant boost of production. Only limited production can be achieved due to ineffective control of weeds, responsible for 20% to 80% of yield losses. The project called Weed Identification and Knowledge in the Western Indian Ocean (WIKWIO) focus on weed knowledge and management through informed scientific and technological approaches.

Hestia Nienaber

ARC-SMALL GRAIN INSTITUTE, AN
ARC INSTITUTE OF THE FIELD CROPS
DIVISION

The second technical workshop of Weed Identification and Knowledge in the Western Indian Ocean region (WIKWIO) brought together partner teams of the project in Madagascar. The attendees were unanimous in declaring the project a much needed intervention in support of food security in the area.

Weed identification and knowledge in the region aims to strengthen science and technology orientation to achieving food security. Agricultural productivity is hampered by many factors, one being weeds. Agriculture and farming is becoming knowledge intensive and weed management also, but information access and its effective use still remains constrained in Africa and in the Indian Ocean region.

In a region that needs to innovate its agriculture rapidly, the use of new agricultural knowledge becomes essential and critical. WIKWIO aims to build and leverage a science and technology network which will consolidate existing scientific knowledge.

Apart from partner teams of the pro-

ject, delegates from Belgia, India, Ethiopia, Tanzania and South Africa attended the workshop, as well as participants from Madagascar.

Amongst the points that were presented and discussed was the weed species list and information managed, according to countries and cropping systems, and the training of participants in the use of tools and data management.

The WIKWIO participatory portal

The participatory portal is a Web-2.0 collaborative space for both the public and members of the WIKWIO project. It is available at <http://portal.wikwio.org>. The portal is for public consultation but participation and contribution portal requires registration. The portal allows users to:

- consult or contribute to species information spreadsheets;
- supply weed observations;
- supply maps;
- share information, working documents, checklists of species;
- access the IDAO identification tool online;
- manage working groups on specific topics such as cropping systems (sugar cane, orchards, etc.) or general topics (weed science, communication);
- create, animate and participate to online discussions.

At the moment the portal contents include:

- information for 345 weed species;
- 2 299 field observations;
- 19 documents (protocols, guidelines, technical brochures)
- four check lists corresponding to tables of weed status of the species according to the main cropping systems of each country; and
- an IDAO identification tool for the 345 weed species, available online.

Identification and database

The WIKWIO IDAO identification of weeds using the identikit tool enables the identification of an actual set of 345 weed species of cropping systems in the

Indian Ocean region at any stage of development or from incomplete samples, without requiring prior knowledge in botany or taxonomy. Moreover, this process is less sensitive to errors than a classical identification-tree, where one mistake can lead to a completely wrong identification. Species are listed in order of probability of consistency with the information provided by the user.

The online database enables online and multi-user data management. Species pages are available in English for 140 species. Species pages will be completed or updated during the course of the project. The WIKWIO database contains 2 299 observations and more than 8 000 images.

A list of 320 species was established during the launching workshop, concerning 14 cropping systems of the region. Along the first months of field surveys in the countries, a new set of 25 species have been added for a weed flora of 345 species.

The WIKWIO project is running smoothly and contributing to facilitate communication between contributors and all other involved parties. ♣



Die gebruik van WIKWIO as handige program om onkruid te identifiseer

LNR-Kleingraaninstituut () - Hestia Nienaber

Agtergrond

WIKWIO is die afkorting vir WEED IDENTIFICATION AND KNOWLEDGE IN THE WESTERN INDIAN OCEAN. WIKWIO streef daarna om wetenskap- en tegnologie-oriëntasie te versterk, sodat voedselsekuriteit verkry kan word deur die verbetering van landbouproduktiwiteit in Suidelike Afrika. Huidiglik word landbouproduktiwiteit beïnvloed deur verskillende faktore, waarvan onkruid een van die belangrikste is. Landbou en boerdery maak sterk staat op kennis van onkruid en die bestuur daarvan, maar die toegang tot inligting en die effektiewe gebruik daarvan is steeds beperk in Afrika en die Indiese Oseaan. Landbou moet dus vinnig innoverend word, dus is die gebruik van landboukennis noodsaaklik en selfs van kritieke belang. WIKWIO streef daarna om 'n wetenskaplike en tegnologiese netwerk te stig, wat die deel van nuwe inligting oor onkruid en effektiewe bestuurspraktyke vir voedsel en kontantgewasse in die Westelike Indiese Oseaan gebiede kan fasiliteer.

Landbou is die hoofbron van inkomste vir meeste van die eilandstate in die Indiese Oseaan, asook in die Suid-Oostelike dele van Afrika. Onkruid kan betekenisvolle verliese in voedsel- en kontantgewassisteme veroorsaak. Die optimisering van onkruidbeheer kan dus lei tot 'n betekenisvolle verhoging in produktiwiteit. Slegs beperkte produksie kan behaal word agv oneffektiewe beheer van onkruid (wat verantwoordelike kan wees vir oesverliese van 20-80%).

Die program

Die tweede tegniese werkswinkel was in Madagascar gehou vanaf 20-24 Oktober 2014. Verskeie samewerkers was teenwoordig. Tydens die werkswinkel is die program, asook hoe dit werk, aan die samewerkers verduidelik.

Die webtuiste kan besoek word by <http://portal.wikwio.org> (<http://portal.wikwio.org>). Lede van die publiek kan ook die webtuiste besoek vir bydraes tot spesie-inligting of om hulp te vra t.o.v. die identifisering van onkruid.

Onkruidobservasies kan gedoen word, kaarte kan verskaf word, inligting kan gedeel word of dokumente kan gelaai word. Verskeie werksgroepe, wat fokus op spesifieke onderwerpe, kan ook so bereik word.

Die IDAO-identifiseringsprogram kan ook aanlyn gevind word by www.wikwio.org/ido/ (<http://www.wikwio.org/ido/>). Hierdie program kan bereik word vanaf 'n slimfoon, 'n rekenaar of 'n tablet. Observasies kan dus gedoen word vanuit die veld. Die identifisering van onkruid is ook moontlik vanuit die veld.

So min as drie karaktereienskappe van die onkruid kan lei tot die korrekte identifisering van die onkruid (mits die onkruid reeds op die sisteem is). Hoe meer karaktereienskappe egter ingevoer word op die program, hoe akkurater raak die identifisering. Enige groeistadium van die onkruid kan gebruik word. Inligting t.o.v. oorsprong, verspreiding, ekologie, beheermaatreëls en foto's is beskikbaar. Indien die onkruid nog nie op die databasis is nie, is dit die perfekte geleentheid om 'n nuwe onkruid op die sisteem te laai.



Foto 1: Samewerkers van die tweede tegniese WIKWIO werkswinkel



Foto 2: Die tuisblad van die WIKWIO webtuiste

Samevatting

Tans is daar reeds 345 onkruidspesies geïdentifiseer en 2 299 veldobservasies is reeds gemaak. Die program is egter deurentyd besig om nuwe data by te voeg. Enige voorstelle van hoe om die program meer effektief en gebruikersvriendelik te maak, of vir enige verdere navrae, stuur gerus 'n epos aan deweth@arc.agric.za.